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Sören Prehn, Bernhard Brümmer, Thomas Glauben

Department für Agrarökonomie und  
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D 37073 Göttingen  
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# An Extended Viner Model: Trade Creation, Diversion & Reduction\*

Sören Prehn<sup>††</sup>, Bernhard Brümmer<sup>§</sup>, Thomas Glauben<sup>‡</sup>

<sup>‡</sup>*Department of Agricultural Markets, Marketing and World Agricultural Trade*

*Leibniz Institute of Agricultural Development in Central and Eastern Europe*

<sup>§</sup>*Department of Agriculture Economics and Rural Development*

*Georg August Universität Göttingen*

## Abstract

In this paper, we are going to reconsider the standard Viner Model [Viner, 1950] however under the premise of firm heterogeneity. By means of a graphical analysis we show that a consideration of the degree of firm heterogeneity is important for an evaluation of a preferential trade agreement. Depending on the degree of firm heterogeneity in the preferential country and the non-preferential country either a price increase and trade creation occurs or a price decrease and trade reduction. The standard Viner Model neither makes any predictions with regard to price changes nor can it explain trade reduction. The graphical analysis conducted here yields additional insights into the impacts of preferential trade agreements on trade.

**Keywords:** International Trade, Preferential Trade Agreements, Viner Model, Firm Heterogeneity, Intensive Margin, Extensive Margin

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<sup>†</sup> Corresponding author. Leibniz-Institut für Agrarentwicklung in Mittel- und Osteuropa, Abteilung Agrarmärkte, Agrarvermarktung und Weltagrarhandel, Theodor-Lieser-Str. 2, 06120 Halle (Saale), Germany. Phone: +49 (0) 345 2928 248.

*Email address:* [prehn@iamo.de](mailto:prehn@iamo.de) (Sören Prehn)

# 1 Introduction

The analysis of preferential trade agreements (PTA) has always been important. With the slow progress at the world trade organization (WTO) its importance has even grown faster. Many WTO member states decided to liberalize bilaterally and negotiated a couple of preferential trade agreements. So, in the last two decades more than 200 preferential trade agreements were negotiated [WTO, 2011].

With the political importance also the scientific importance has grown. Several recent empirical studies exist to accompany the political decision process. Most of these studies are based on the theoretical model of Viner [1950]. This model predicts that preferential trade agreements lead to trade diversion and trade creation. Depending on the country size, there will be only trade diversion or, if the preferential country is large, also trade creation.

Originally, the focus was only on the intensive margin of trade but now the focus is also on the extensive margin of trade. There is empirical evidence that a preferential trade agreement not only increases the exports of already existing exporters (i.e. changes along the intensive margin of trade) but also that new firms can even enter the export market (i.e. changes along the extensive margin of trade); here, the number of new entrants is directly related to the firm heterogeneity structure (i.e. the productivity distribution) of the country. The trade impacts of these new entrants are both statistically and economically important [Baier et al., 2011].

Yet, so far no one has explicitly focused on the firm heterogeneity structure of the preferential country and the non-preferential country and its implications for the analysis of a preferential trade agreement. We will show that it is crucial to consider explicitly for different productivity distributions (i.e. different degrees of firm heterogeneity) across countries in the analysis of preferential trade agreements. As our graphical analysis reveals, either a price increase and trade creation or a price decrease and trade reduction occurs depends on the degree of firm heterogeneity in the preferential country and the non-preferential country. The standard Viner model neither makes any predictions with regard to price changes nor can it explain trade reduction. Our graphical model yields new insights in the impacts of preferential trade liberalization which should be examined in future work.

Our paper is organized as follows. In the next section, we develop our graphical model. Within this framework, we derive some general propositions. Afterwards, we conclude.

## 2 An Extended Viner Model

In the following, we extend the standard Viner model [1950] for firm heterogeneity. We first focus on the case of a price decrease and trade reduction (see figure 1) and then on the case of a price increase and trade creation (see figure 2).

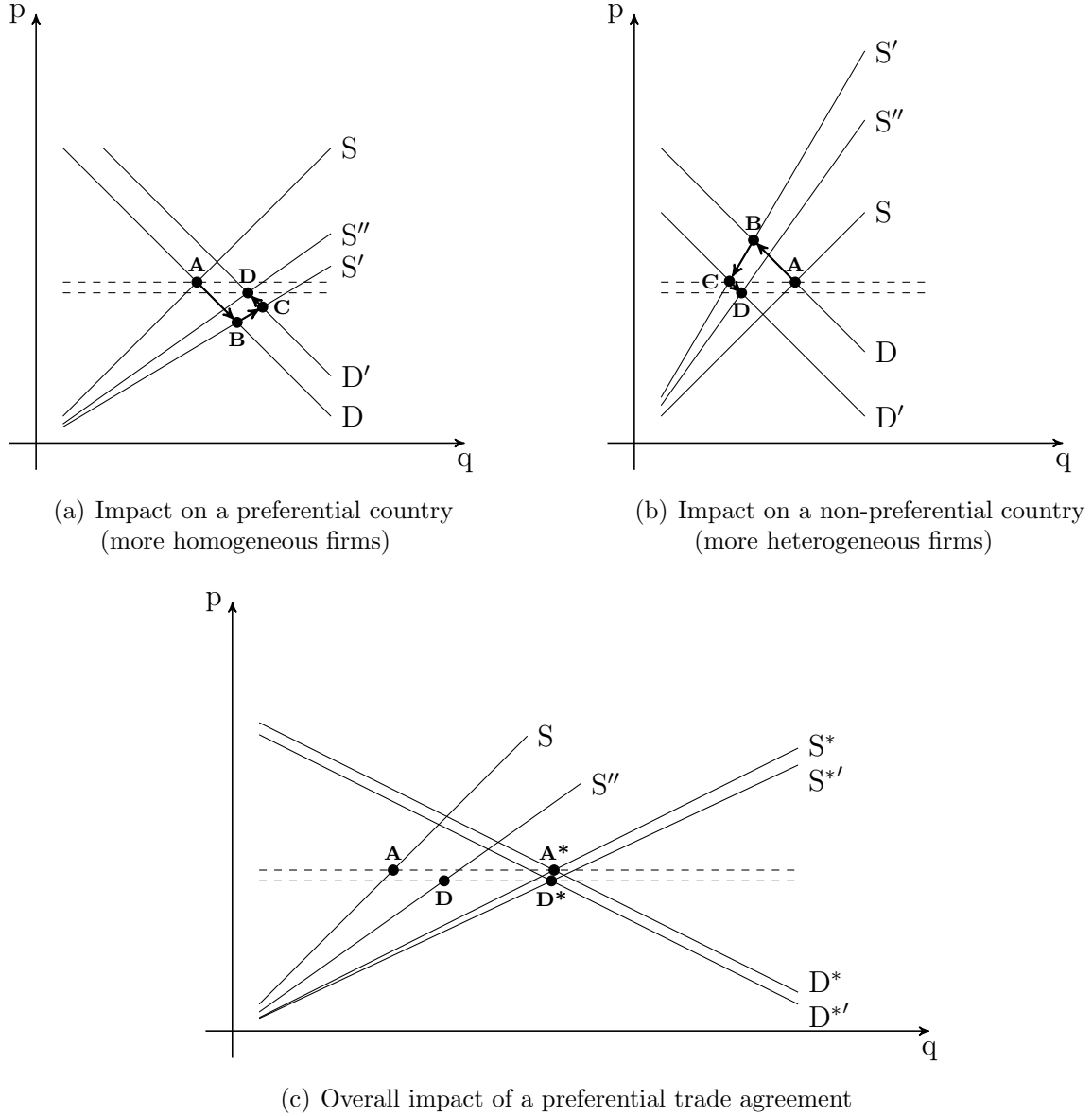


Figure 1: An Extended Viner Model: Price Decrease & Trade Reduction

In contrast to the [Viner](#) model, we assume two identical countries which only differ in their firm heterogeneity structure, and, in addition, that an ad valorem tariff is applied instead of a specific tariff. The market structure is always monopolistic competitive.

In figure 1 the first case of a price decrease and trade reduction is depicted. In panel (a) and (b) country-specific effects are depicted, whereas the overall effect is depicted in panel (c). Aggregate supply functions are always indicated by  $S$  and aggregate demand functions by  $D$ .

In panel (a) the impact of a preferential trade agreement on a preferential country is depicted. Tariff reduction leads to a decrease in marginal costs which in turn increases the exports of a single firm. The aggregate supply function therefore shifts downward from  $S$  to  $S'$ . The corresponding new equilibrium point is  $B$ . This increase in demand is equatable with a change in the intensive margin of trade.

However, through tariff reduction also new firms are able to enter the export market. That is why the aggregate demand function shifts outward from  $D$  to  $D'$ . The corresponding new equilibrium price in  $C$  is higher since on average the productivities of new entrants are lower what in turn implies higher marginal costs and thus an increase in prices. This shift in demand can be regarded as a change in the extensive margin of trade.

The increase in exports, however, also impacts on the domestic labor market. Here, through the increase in exports, the demand for labor increases what bids up wages. This again increases marginal costs and thus counteracts - at least in parts - the former two effects. Single firm exports decrease that is why the aggregate supply function shifts upward from  $S'$  to  $S''$ . This is the input factor price effect, which is associated with intra-industry reallocations, as mentioned in [Melitz \[2003\]](#).

There are, however, not only impacts on the part of the preferential country but also on the part of the non-preferential country. These impacts are depicted in panel (b). Here, a tariff reduction in the preferential country implies an increase in the relative price and thus an increase in the relative marginal costs what in turn decreases market shares and thus the exports of a single firm [[Baldwin, 2005](#)]. The aggregate supply function therefore shifts upward from  $S$  to  $S'$ . The corresponding new equilibrium point is  $B$ . This decrease in demand again can be regarded as a change in the intensive margin of trade.

However, through the increase in relative prices and relative marginal costs, respectively, some firms cannot anymore produce profitable and therefore are forced to exit the market. That is why the aggregate demand function shifts inward from  $D$  to  $D'$ . The corresponding new equilibrium price in  $C$  is lower since on average the productivities of the left exporters are higher what in turn implies lower marginal costs and thus a decrease in prices. Again, this shift in demand is equatable with a change in the extensive margin of trade.

As for the preferential country, so for the non-preferential country the decrease in exports impacts on the domestic labor market. Here, through the decrease in exports, the demand for labor decreases what bids down wages. This in turn decreases marginal costs and thus counteracts - at least in parts - the former two effects. Single firm exports increase that is why the aggregate supply function shifts downward from  $S'$  to  $S''$ . Again, this is the already mentioned input factor price effect, which is associated with intra-industry reallocations.

For figure 2, panel (a) and (b) the same economic argumentation applies.

So far, however, we have neglected the firm heterogeneity structure of countries. That a consideration of the degree of firm heterogeneity is important becomes clear when one compares the panels (c) in figure 1 and in figure 2. Both panels depict an overall effect of a preferential trade agreement, on the one hand when firm heterogeneity structure of the preferential country is more homogeneous and on the other hand when the firm heterogeneity structure of the preferential country is more heterogeneous. Always the changes in total aggregate supply  $S^*$  and total aggregate demand  $D^*$  of both countries are

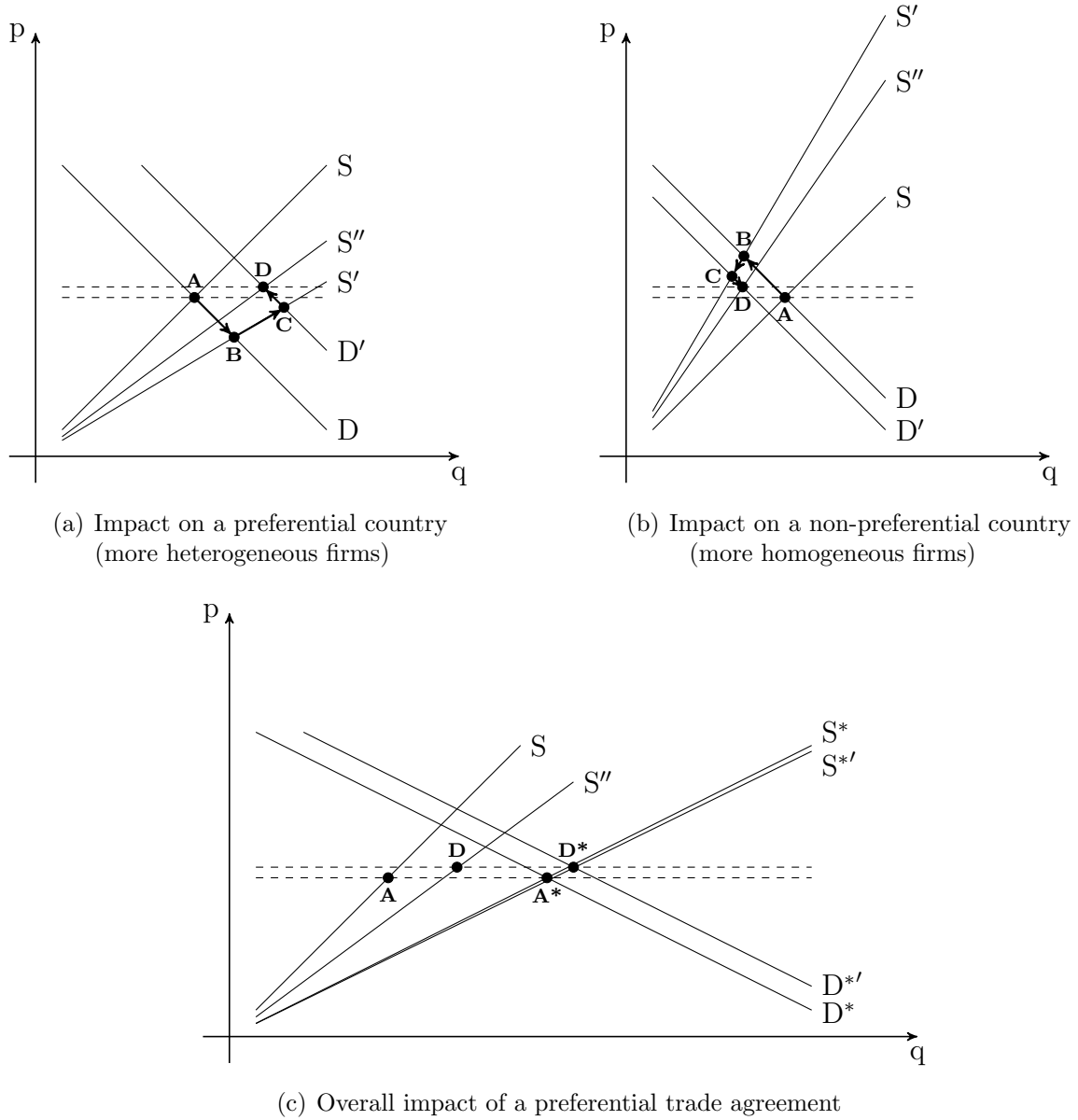


Figure 2: An Extended Viner Model: Price Increase & Trade Creation

compared. As before,  $A^*$  indicates the starting point and  $D^*$  the final equilibrium point.

Figure 1 proves that if the firm heterogeneity structure in the preferential country is more homogeneous than in the non-preferential country then total aggregate demand shifts inward from  $D^*$  to  $D^{*'}.$  This shift in demand is the stronger the stronger the change in the extensive margin of trade of the non-preferential country is compared to the change in the preferential country, and vice versa. The opposite applies for figure 2. Here, the shift in demand is the stronger the stronger the change in the extensive margin of trade of the preferential country is compared to the change in the non-preferential country, and vice versa. Also the changes in total aggregate supply  $S^*$  are directly related to the extensive margin of trade: the higher the change in the extensive margin of trade is the higher is the input factor price effect, and vice versa. Since the input factor price effect is always negative in the preferential country and always positive in the non-preferential country,

the downward shift in total aggregate supply is higher in the case of a more homogeneous preferential country than in the case of a more heterogeneous preferential country. Taking all effects together, if the preferential country is more homogeneous than the non-preferential country then a price decrease and trade reduction are expected, whereas if the preferential country is more heterogeneous than the non-preferential country then a price increase and trade creation are expected. Propositions 1.1 and 1.2 summarize again our results.

**PROPOSITION 1.1** (Price Decrease & Trade Reduction): *The higher the degree of firm heterogeneity is in the non-preferential country relative to the preferential country the higher is the price decrease and trade reduction.*

**PROPOSITION 1.2** (Price Increase & Trade Creation): *The higher the degree of firm heterogeneity is in the preferential country relative to the non-preferential country the higher is the price increase and trade creation.*

Our model also yields some new insights into the degree of trade diversion summarized in Proposition 2.

**PROPOSITION 2** (Degree of Trade Diversion): *The higher the degree of firm heterogeneity is in the non-preferential country relative to the preferential country the higher is trade diversion, and vice versa.*

### 3 Conclusions

In this paper, we reconsider the standard Viner Model [Viner, 1950]. Motivated by the work of Melitz [2003], we extend the Viner Model for firm heterogeneity. In a graphical analysis we show that the difference in the degree of firm heterogeneity in the preferential country and the non-preferential country is important for the overall impact of a preferential trade agreement on trade. If the degree of firm heterogeneity is higher in the preferential country than in the non-preferential country then a price increase and trade creation should occur, whereas for a lower degree of firm heterogeneity one should expect a price decrease and trade reduction. The changes in price and reversals in trade are connected to different developments at the extensive margin and adjustments in wages.

The results of this paper yield additional insights into the impacts of preferential trade agreements. In particular, the graphical framework is a valuable tool to give a first rough estimate of the expected impacts of a preferential trade agreement.

In further research our theoretical predictions should be tested.

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| <b>1006</b>        | Hellberg-Bahr, Anneke,<br>Martin Pfeuffer,<br>Nina Steffen,<br>Achim Spiller u.<br>Bernhard Brümmer             | Preisbildungssysteme in der Milchwirtschaft -Ein Überblick über die Supply Chain Milch                                                                    |
| <b>1007</b>        | Steffen, Nina,<br>Stephanie Schlecht,<br>Hans-Christian Müller u.<br>Achim Spiller                              | Wie viel Vertrag braucht die deutsche Milchwirtschaft?- Erste Überlegungen zur Ausgestaltung des Contract Designs nach der Quote aus Sicht der Molkereien |

|                    |                                                                                                                              |                                                                                                                                                        |
|--------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1008</b>        | Prehn, Sören,<br>Bernhard Brümmer u.<br>Stanley R. Thompson                                                                  | Payment Decoupling and the Intra – European Calf Trade                                                                                                 |
| <b>1009</b>        | Maza, Byron,<br>Jan Barkmann,<br>Frank von Walter u.<br>Rainer Marggraf                                                      | Modelling smallholders production and agricultural income in the area of the Biosphere reserve “Podocarpus - El Cóndor”, Ecuador                       |
| <b>1010</b>        | Busse, Stefan,<br>Bernhard Brümmer u.<br>Rico Ihle                                                                           | Interdependencies between Fossil Fuel and Renewable Energy Markets: The German Biodiesel Market                                                        |
| <b><u>2011</u></b> |                                                                                                                              |                                                                                                                                                        |
| <b>1101</b>        | Mylius, Donata,<br>Simon Küest,<br>Christian Klapp u.<br>Ludwig Theuvsen                                                     | Der Großvieheinheitenschlüssel im Stallbaurecht - Überblick und vergleichende Analyse der Abstandsregelungen in der TA Luft und in den VDI-Richtlinien |
| <b>1102</b>        | Klapp, Christian,<br>Lukas Obermeyer u.<br>Frank Thoms                                                                       | Der Vieheinheitenschlüssel im Steuerrecht - Rechtliche Aspekte und betriebswirtschaftliche Konsequenzen der Gewerblichkeit in der Tierhaltung          |
| <b>1103</b>        | Göser, Tim,<br>Lilli Schroeder u.<br>Christian Klapp                                                                         | Agrarumweltprogramme: (Wann) lohnt sich die Teilnahme für landwirtschaftliche Betriebe?                                                                |
| <b>1104</b>        | Plumeyer, Cord-Herwig,<br>Friederike Albersmeier,<br>Maximilian Freiherr von Oer,<br>Carsten H. Emmann u.<br>Ludwig Theuvsen | Der niedersächsische Landpachtmarkt: Eine empirische Analyse aus Pächtersicht                                                                          |
| <b>1105</b>        | Voss, Anja u.<br>Ludwig Theuvsen                                                                                             | Geschäftsmodelle im deutschen Viehhandel: Konzeptionelle Grundlagen und empirische Ergebnisse                                                          |
| <b>1106</b>        | Wendler, Cordula,<br>Stephan v. Cramon-Taubadel,<br>Hardwig de Haen,<br>Carlos Antonio Padilla Bravo<br>u. Samir Jrad        | Food security in Syria: Preliminary results based on the 2006/07 expenditure survey                                                                    |
| <b>1107</b>        | Prehn, Sören u.<br>Bernhard Brümmer                                                                                          | Estimation Issues in Disaggregate Gravity Trade Models                                                                                                 |
| <b>1108</b>        | Recke, Guido,<br>Ludwig Theuvsen,<br>Nadine Venhaus u.<br>Anja Voss                                                          | Der Viehhandel in den Wertschöpfungsketten der Fleischwirtschaft: Entwicklungstendenzen und Perspektiven                                               |
| <b>1109</b>        | Prehn, Sören u.<br>Bernhard Brümmer                                                                                          | “Distorted Gravity: The Intensive and Extensive Margins of International Trade”, revisited: An Application to an Intermediate Melitz Model             |

| <b><u>2012</u></b> |                                                                                                                                                                                                                                                  |                                                                                                                                                            |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1201</b>        | Kayser, Maike,<br>Claudia Gille,<br>Katrin Suttorp u.<br>Achim Spiller                                                                                                                                                                           | Lack of pupils in German riding schools? – A causal-analytical consideration of customer satisfaction in children and adolescents                          |
| <b>1202</b>        | Prehn, Sören u.<br>Bernhard Brümmer                                                                                                                                                                                                              | Bimodality & the Performance of PPML                                                                                                                       |
| <b>1203</b>        | Tangermann, Stefan                                                                                                                                                                                                                               | Preisanstieg am EU-Zuckermarkt: Bestimmungsgründe und Handlungsmöglichkeiten der Marktpolitik                                                              |
| <b>1204</b>        | Würriehausen, Nadine,<br>Sebastian Lakner u.<br>Rico Ihle                                                                                                                                                                                        | Market integration of conventional and organic wheat in Germany                                                                                            |
| <b>1205</b>        | Heinrich, Barbara                                                                                                                                                                                                                                | Calculating the Greening Effect – a case study approach to predict the gross margin losses in different farm types in Germany due to the reform of the CAP |
| <b>1206</b>        | Prehn, Sören u.<br>Bernhard Brümmer                                                                                                                                                                                                              | A Critical Judgement of the Applicability of ‘New New Trade Theory’ to Agricultural: Structural Change, Productivity, and Trade                            |
| <b>1207</b>        | Marggraf, Rainer,<br>Patrick Masius u.<br>Christine Rumpf                                                                                                                                                                                        | Zur Integration von Tieren in wohlfahrtsökonomischen Analysen                                                                                              |
| <b>1208</b>        | Sebastian Lakner,<br>Bernhard Brümmer,<br>Stephan v. Cramon-Taubadel<br>Jürgen Heß,<br>Johannes Isselstein,<br>Ulf Liebe,<br>Rainer Marggraf,<br>Oliver Mußhoff,<br>Ludwig Theuvsen,<br>Teja Tschardtke,<br>Catrin Westphal u.<br>Gerlinde Wiese | Der Kommissionsvorschlag zur GAP-Reform 2013 - aus Sicht von Göttinger und Witzenhäuser Agrarwissenschaftler(inne)n                                        |
| <b>1209</b>        | Prehn, Sören, Brümmer,<br>Bernhard und Glauben,<br>Thomas                                                                                                                                                                                        | Structural Gravity Estimation & Agriculture                                                                                                                |
| <b>1210</b>        | Prehn, Sören, Brümmer,<br>Bernhard und Glauben,<br>Thomas                                                                                                                                                                                        | An Extended Viner Model: Trade Creation, Diversion & Reduction                                                                                             |



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2000 bis 31. Mai 2006:

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Ed. Winfried Manig (ISSN 1433-2868)

|    |                                                                    |                                                                                                                                |
|----|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
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1969/70 wurde durch Zusammenschluss mehrerer bis dahin selbständiger Institute das **Institut für Agrarökonomie** gegründet. Im Jahr 2006 wurden das Institut für Agrarökonomie und das Institut für RURale Entwicklung zum heutigen **Department für Agrarökonomie und RURale Entwicklung** zusammengeführt.

Das Department für Agrarökonomie und RURale Entwicklung besteht aus insgesamt neun Lehrstühlen zu den folgenden Themenschwerpunkten:

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- Internationale Agrarökonomie
- Landwirtschaftliche Betriebslehre
- Landwirtschaftliche Marktlehre
- Marketing für Lebensmittel und Agrarprodukte
- Soziologie Ländlicher Räume
- Umwelt- und Ressourcenökonomik
- Welternährung und rurale Entwicklung

In der Lehre ist das Department für Agrarökonomie und RURale Entwicklung führend für die Studienrichtung Wirtschafts- und Sozialwissenschaften des Landbaus sowie maßgeblich eingebunden in die Studienrichtungen Agribusiness und Ressourcenmanagement. Das Forschungsspektrum des Departments ist breit gefächert. Schwerpunkte liegen sowohl in der Grundlagenforschung als auch in angewandten Forschungsbereichen. Das Department bildet heute eine schlagkräftige Einheit mit international beachteten Forschungsleistungen.

Georg-August-Universität Göttingen  
Department für Agrarökonomie und RURale Entwicklung  
Platz der Göttinger Sieben 5  
37073 Göttingen  
Tel. 0551-39-4819  
Fax. 0551-39-12398  
Mail: [biblio1@gwdg.de](mailto:biblio1@gwdg.de)  
Homepage : <http://www.uni-goettingen.de/de/18500.html>